

What is claimed is:

1. A high-voltage transmission cable comprising:
an aluminum conductor, an electrically insulative sheath, and a carbon core,
wherein said aluminum conductor surrounds said sheath and said sheath
surrounds said carbon core.
2. The transmission cable of claim 1, wherein said sheath is made of a material
capable of withstanding an operating temperature greater than 150 degrees C.
3. The transmission cable of claim 2, wherein said sheath is made of PTFE.
4. The transmission cable of claim 2, wherein said sheath is made of a material
from the group consisting of poly-paraphenylene terephthalamide, poly p-phenylene,
aramid fiber, and combinations thereof.
5. The transmission cable of claim 2, wherein said sheath has a low coefficient of
friction and provides a slip plane to reduce wear between said aluminum conductor and
said carbon core.
6. The transmission cable of claim 1, wherein said carbon core comprises a carbon-
fiber reinforced composite rod.
7. The transmission cable of claim 6, wherein said carbon-fiber reinforced
composite rod comprises carbon fiber pultruded in a high-temperature polymeric
material.
8. The transmission cable of claim 6, wherein said high-temperature polymeric
material includes materials from the group consisting of thermoset polymers,
thermoplastic polymers, and combinations thereof.

9. The transmission cable of claim 6, wherein said carbon core includes a plurality of said carbon-fiber reinforced composite rods.
10. The transmission cable of claim 9, wherein one or more of said rods are substantially trapezoidal in shape.
11. The transmission cable of claim 6, wherein said carbon core is a bundle of said plurality of said carbon-fiber reinforced composite rods, and wherein said rods are twisted slightly axially.
12. The transmission cable of claim 6, wherein said plurality of said carbon core is a bundle of said plurality of carbon-fiber reinforced composite rods, and wherein said rods are axially aligned.
13. The transmission cable of claim 1, wherein said carbon core comprises a braid of dry carbon fibers.
14. The transmission cable of claim 1, wherein said carbon core comprises a rope of unidirectionally aligned dry carbon fibers.
15. The transmission cable of claim 1, wherein said aluminum conductor includes a plurality of aluminum rods.
16. The transmission cable of claim 15, wherein said plurality of aluminum rods are twisted slightly relative to an axial direction of said cable.
17. The transmission cable of claim 15, wherein said plurality of aluminum rods are wrapped axially about said core and said sheath.
18. The transmission cable of claim 1, wherein said aluminum conductor is a sectioned aluminum coating over said sheath and said carbon core.

19. The transmission cable of claim 18, wherein said sectioned aluminum coating is applied over said sheath and said carbon core.